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N THE GEOGRAPHICAL DISTRIBUTION OF THE FALLOW DEER PAST AND PRESENT.

TRANSLATED FROM THE GERMAN OF L. H. JEITTELES.*

BY P. D. ULLMANN AND J. E. HARTING.

ATURAL HISTORY shares with History the doubtful honour
ossessing many chapters which are nothing more than what
eyrand would call "des fables convenues," or which are
e up of fallacies universally adopted as true. To this un-
urable side of science Geology contributes the largest share,
Zoology is by no means exempt, especially as regards the
ts, haunts and geographical distribution of animals.

ccording to most works on Zoology, "The Fallow Deer (*Cervus*
a) is a native of the countries washed by the Mediterranean,
whence it was introduced into Germany, Scandinavia, and
land after the Crusades." And yet this animal was equally
genous many thousand years ago, not only in Africa and
stern Asia, but also in Southern Russia, and even in Central
ope, Denmark, Italy, and the South of France.

ly researches into the geographical distribution of the Fallow

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Ueber die geographische Verbreitung des Damhirsches in der Vorzeit und
nwart.' Von L. H. Jeitteles, 'Der Zoologische Garten,' 1874, pp. 288—297.
this article had been translated and forwarded to the printers, we discovered
an English translation by Mr. P. L. Sclater had already appeared in 'Nature'
November, 1874). To many readers of 'The Zoologist,' however, we believe
ubject matter will be new, and therefore we do not hesitate to offer the present
on. At the same time we cannot do better than quote, by way of supplement,
valuable criticisms which this essay has elicited from Prof. Boyd Dawkins
ture,' 10th December, 1874) and Sir Victor Brooke ('Nature,' 14th Jan. 1875).

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Deer, as well as my study of the history of the domestic fowl,* were occasioned by an antiquarian discovery at Olmütz. There, in the same stratum with the skull of the domestic fowl, and amongst weapons and utensils of the early Bronze Age, was found a piece of horn, which from its flatness and from the total absence of rugosities and tubercles (*runzeln und perlen*), I was at once inclined to consider a fractured portion of the horn of a Fallow Deer. Careful comparison with the horn of the Red Deer, Reindeer, Elk, and Irish Elk, in different museums, particularly those of Stuttgardt and Munich, and in numerous private collections, confirmed my opinion. Reliable authorities on the *Cervidæ* agreed with me, although a still greater authority, Professor Rütimeyer of Basle, suggested the possibility of this fragment from Olmütz having belonged to a Red Deer.

Cuvier mentions fossil horns of the Fallow Deer, and speaks of "bois assez semblables à ceux du Daim, mais d'une très grande taille, trouvés dans la vallée de la Somme et en Allemagne."† He has also figured two pieces of horn from Abbeville, which are certainly taken from the true Fallow Deer. Moreover, he has given a copy of a drawing sent to him by Autenrieth :—"D'un crâne et d'un merrain y adhèrent, déposés au cabinet de Stuttgardt; pièces que ce savant rapportait au cerf à bois gigantesques, mais qui me paraissent plutôt se devoir rapporter à ce Daim à cause de la longueur de la partie cylindrique."‡ Subsequently similar remains of horn were dug up in Gergovia, near Clermont, in the Departement of Puy-de-Dôme, and at Polignac, near Puy, in the Departement of Haute-Loire, which were described by F. Robert as those of *Cervus dama polignacus;* by Pomel as *C. somonensis* and *C. Roberti;* and by Gervais as *C. somonensis*, with an original figure by Desmarest. Gervais describes them as "des bois de Daims qui indiquent une espèce ou variété bien plus grande que celle dont il a été question ci-dessus" (namely, *C. dama*); and that these horns were "d'un tiers a moins plus grande que ceux du Daims ordinaire." §

Georg Jäger, in his "Review of the Fossil Mammalia of Wurtemburg," || refers to numerous discoveries of the remains of Fallow

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* See 'Zool. Garten,' vol. xiv., p. 55.

† 'Recherches sur les Ossemens Fossiles,' vol. vi., Article iii., p. 191 (ed. 1836).

‡ Id., pl. 168, fig. 11.

§ Zool. Paléon. Franç., 2 ed., Paris, 1859, p. 145.

|| 'Nova Acta Acad. Cæs. Leop. Carol.,' vol. xxii., pars post. 1850, pp. 807, 893, 897.

Deer in the caves and bogs, as well as in the diluvial fresh-water chalk of Wurtemburg. He further states that in the Museum of Mannheim there are skulls not only of *Bos primigenius*, but also of *B. priscus* and its ally *B. priscus affinis*, with a skull of *Cervus dama giganteus*, all found in the diluvium in the neighbourhood of Mannheim.

In the Museum at Linz, in Upper Austria, numerous remains of animals from the diluvium in the neighbourhood of Wels are preserved, which were discovered at no great distance in cutting the railway known as the Elizabeth-Westbahn in Buchberg. Besides a fractured piece of the horn of a Red Deer, a molar of *Ursus arctos* (not *U. spelæus*), a fine molar of the Mammoth (*Elephas primigenius*) and horses' teeth, there is in the Museum—amongst those remains marked as found in the above-mentioned railway cutting—a fine large fragment of horn undoubtedly belonging to a Fallow Deer. Like the fragment of horn of *Cervus elaphus* from the same locality, it is of a white colour and has a calcined appearance. In 1870 and again in 1873 I examined this interesting fragment of horn, with the other animal remains found at the same time, and am indebted to the kindness of Herr Kaiserl Ehrlich, the Curator of the Museum, for a photograph of it. In October, 1873, I also inspected the cutting at Buchberg, and convinced myself of the purely diluvial nature of the soil there. In many places I found it deeply excavated for gravel (*schotter*), and it seems clear that the horns and teeth preserved in the Museum at Linz were found in one of these gravel-pits, but lying in a stratum of marl (*mergeligen*) beneath the gravel.

Fragments of horn undoubtedly belonging to the Fallow Deer were dug out by Dr. F. A. Wagner in the autumn of 1828, in the ash-heap (*aschenschicht*) of a so-called place of sacrifice (*opferherdes*) between Schlieben and the village of Malitzschkendorf, in Schweinitz, Saxony, in large quantities, together with remains of the Elk (among them a four-tined elk-horn), the teeth of mighty boars, and remains of very large oxen, roe-deer, and sheep, as well as wheat and millet. A detailed account of these discoveries is given in his work.* Dr. Wagner (a physician at Schlieben) prosecuted his researches with the greatest conscientiousness and determined the animal remains in question with great care and skill, as will be evident from his work, the bombastic title of which may be overlooked. In the determination of the various fragments of horns he was assisted by a well-known and excellent zoologist, Professor Nitzsch, of Halle. The four-tined elk-horn is figured (pl. v., fig. 8), but unfortunately not the pieces of Fallow Deer's horns. Besides the remains of animals and plants, these places of sacrifice yielded various fashioned bones, three needles, fragments of battle-axes, pieces of urns, four entire vessels, and a polished shin-bone of an ox. Dr. Wagner also recognised therein a skate and other bones beautifully polished. No human bones were found. As regards the Fallow Deer, Dr. Wagner writes as follows (p. 34):—"In digging at various times in this temple, we found fragments of horns which were more than suggestive of those of the Fallow Deer; but as no complete skeleton was ever secured, nor even such portions as would place the matter beyond doubt, it is still uncertain whether this species was sacrificed along with the Elk (*Cervus alces*), and the subject requires further investigation."

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* 'Ægypten in Deutschland oder die germanisch-slavischen wo nicht rein germanischen Alterthümer an der schwarzen Elster.' Leipzig, Hartmann, 1833.

Alex. von Nordmann, in his 'Palæontologie Südrusslands,'[*] gives a drawing of five teeth from a "*Cervus fossilis damæ affinis.*" But in the diluvial period, and in later prehistoric times the Fallow Deer existed in more northern latitudes. In the year 1871, in the centre of the town of Hamburg, and subsequently in a tributary of the Elbe, numerous upper and lower jaws were discovered, larger than those of the existing *Cervus dama*, except as regards the teeth, which corresponded in size with those of the existing species. With these were found remains of the Aurochs, and other large oxen, and bones of the horse, pig, and other animals. The remains first discovered were found between tree-stumps in twenty to twenty-two feet of "solid black peat, the alluvium of the Alster, below the diluvial *Geestrücken* of Neustadt."[†]

Prof. Steenstrup has given a short account of the collection of animal remains from the Kjökkenmöddings and peat bogs of Denmark, which were exhibited on the occasion of the Archæological Congress in 1869 in Copenhagen, amongst which he mentions (pp. 160 *et seq.*) the Fallow Deer, whose horns and bones were found in the upper peat of Denmark:—"Le Daim (*Cervus dama*). Bois et ossements provenants des états supérieurs de la tourbe."* Nevertheless he adds, "Cet animal n'est pas originaire du Danemark; il est bien constaté qu'il a été introduit dans le pays pendant le moyen âge."

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[*] Helsingfors, 1858-60, plate xviii., figs. 4—8.

[†] Dr. Zimmermann, on a new species of deer from the alluvium of Hamburg, 'Neuen Jahrbuch für Mineralogie, Geologie und Palæontologie,' Heidelberg, 1872, 1 Heft, p. 26.

In Owen's 'History of British Fossil Mammals and Birds' (1846, pp. 483, 484) are some brief remarks on the discovery of fossil remains of the Fallow Deer in a few localities in England, but the specimens referred to are described as "far from yielding satisfactory grounds of identification." From the peat-moss of Newbury portions of palmated antlers and teeth have been dug out, which accord in size with those of the Fallow Deer, and Dr. Buckland found similar remains in the large cave of Paviland, on the coast of Glamorganshire, with the remains of the Mammoth, Rhinoceros, Hyæna, &c., "deer of two or three species, and fragments of various horns, some small, others a little palmated." Professor Owen justly remarks that "the same doubt as to whether the latter are referable to the Reindeer or the Fallow Deer arises as in the case of the palmated fragments from Newbury."

Among the animal remains found in the Swiss Lake dwellings were discovered fragments of horn that apparently belonged to the Fallow Deer. Referring to this, Prof. Rütimeyer says:†—"A number of flat pieces of palmated horn with perfectly smooth surface found in the Bieler Lake, and now in the collection of Lieutenant Schwab, of Biel, can only belong to the Fallow Deer, judging from their size and form. I could only ascribe to this animal similar pieces from Meilen, which fully agreed with the abnormal form which the horn of the Fallow Deer assumes in old age (Cuv., Ossem. Fossiles, iv., tab. iii., figs. 32—35). At the same time I must remark that I have never yet seen a perfect antler from the pile-dwellings (*Pfahlbauten*), nor even fragments of the skull, which, next to the horn, would offer the most important characteristics of the Fallow Deer. Reliable evidence of the spontaneous existence of this species of deer north of the Alps is therefore still desirable." Nevertheless the existence of this animal in the *Terremare* of Italy—which is equivalent to the Swiss *Pfahlbauten*—is quite certain. In the Museum of Modena are two fragments of horn, respecting which

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* 'Bulletins du Congrès International d'Archéologie préhistorique à Copenhagen en 1869.' Copenhagen, 1872, p. 162.

† 'Fauna der Pfahlbauten der Schweiz,' p. 62.

Professor Canestrini,* and more recently Mortillet,† have given some account. In 1870, at my request, Dr. Carlo Boni, subsequently Director of the Museum of Modena, had the goodness to send to me at Basle—where I was spending the winter of 1869-70—these two fragments for comparison with mine from Olmütz, when Professor Rütimeyer, who also saw them, determined that one of them (marked "624 Gorzano") must have belonged to *Cervus dama.*

As well as in Moravia, the Fallow Deer seems, in olden times, to have existed on the borders of Lower Austria. In Pulkau, not far from Eggenburg, south of the Thaya, in an ancient place of sacrifice, discovered and described by Dr. Woldrich, were found earthen vessels, implements of stone, bone and horn, a bronze casting-mould, the remains of the dog, ox, and red deer, and a piece of horn that was conjectured to be "the tine of a Fallow Deer's antler." ‡

That the Fallow Deer inhabited the woods of Switzerland in the middle ages may be gathered from the following words in the Benediction of the monk Ekkehard, of St. Galle, who lived in the eleventh century:—"*Imbellem damam faciat benedictio summam*;"§ and even at a later date, according to a statement in Forer's German edition of Gesner's 'Natural History' (Heidelberg, 1606, p. 84), where it is said that "The Fallow Deer is hunted in many other places, and is frequently captured in the woods of Switzerland and near Lucerne: it is called Dam, Dämlin, or Damhirsch." In the Latin edition, however (Hist. An., vol. i., 2nd ed., Frankfort, 1620), which is now before me, I can find no important observations on the appearance of the Fallow Deer in Switzerland. The author merely states (p. 308), "Nostra vero dama etiam in Europa capitur cum alibi tum circa Oceanum Germanicum, ut audio. Germani vulgo vocant Dam, vel Dämlin, vel Dannhirtz, vel Damhirtz potius; Itali, Daino, nonnulli Danio; Galli, Dain vel Daim; Hispani, Gamo vel Corza." Moreover, in both the Latin and German editions of Gesner the Fallow Deer is unmistakably portrayed.

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* 'Oggetti trovati nelle terremare del Modenese, Seconda Relazione: Avanzi Organici,' Modena, 1866.

† 'Matériaux pour l'Histoire Positive et Philosophique de l'Homme," 3me année, 1867.

‡ Woldrich, 'Mittheilungen der anthropologischen gesellschaft in Wien,' vol. iii., 1873, pp. 13 and 19, and plate iv., fig. 54.

§ 'Bened. ad mensas Ekkehardi,' Vers. 128. *Vide* 'Mittheil. der Antiquar. Gesellschaft zu Zurich,' iii., p. 111.

According to the marginal notes on Daniel Spekle's excellent map of Alsace there were still Fallow Deer in Wasgau as late as 1576.[*] In the neighbourhood of Rome, in a postpliocene travertine on the heights of Monte delle Gioie, numerous fragments of antlers of the Fallow Deer have been found with remains of *Hyæna spelæa*, *Cervus tarandus*, *Rhinoceros megarhinus*,[†] &c.

Finally, it may be observed that representations of the Fallow Deer are found carved on Assyrian monuments, and with such characteristic accuracy that it is impossible to confuse them with those of any other species. We would recommend the reader to examine the beautiful plates, Nos. 35 and 53, in Layard's 'Monuments of Nineveh.' Representations of this species are also to be seen in the pictures on the walls of Egyptian tombs, as for example at Beni-Hassan. The hieroglyphical name is "hanen."[‡]

We will now consider the present geographical distribution of *Cervus dama*.

This species is still found in a wild state in Asia Minor. Canon Tristram speaks of its occurrence near Mount Tabor, in Palestine, and in the woods between this mountain and the gorge of the Litany River, and he once met with it himself "about ten miles west of the Sea of Galilee."[§] The late Prof. Ed. Lartet had previously found teeth of this species of deer in the bone-heaps of Lebanon.[||] According to Hartmann, "The Fallow Deer inhabits the fertile valleys of the deserts of Africa and the borders of the cultivated parts of Tunis, Tripoli, Barqah, as far as Wâdî-Nâhûn."[¶] Gervais, in his 'Zoologie et Paléontologie Française' (2nd edit., p. 145), records its presence in the neighbourhood of La Calle, in Algiers, but Loche, in his 'Hist. Nat. des Mammiferes de l'Algérie' (Paris, Bertrand, 1867), says it is now seldom met with in that province. In the island of Sardinia, in Cetti's time, there were large numbers of Fallow Deer on every part of the island, and especially on the plains of Sindia.[*] At that time no fewer than 3000 head were annually killed in Sardinia. It is remarkable that the inhabitants call it "Crabolu," a corruption of *Capriolo* (the Roebuck), which does not exist on the island, while the Red Deer is occasionally met with, more particularly in the east, although it does not attain so large a size here as on the Continent.[†] According to Bonaparte and Cornalia,[‡] this species of deer is still tolerably common on this island. In Spain it appears there are very few wild deer now-a-days: at all events, A. E. Brehm, in his 'Beitrag zur Zoologischen Geographie Spaniens,' could only recollect having seen them in parks.[§] On the other hand, Graëlls refers to *Cervus dama* as an inhabitant of the Sierra Guadarrama.[||] The modern Spaniards call this animal "Gamo" or "Paleto." Buffon[¶] says that in his time the Fallow Deer of Spain had longer tails than elsewhere, and were nearly as large as the Red Deer. Gérard, in his 'Faune Historique de l'Alsace,' already quoted (p. 327), informs us that this species of deer still occurs in a wild state in France,—for instance, in Nivernais, in the Cevennes, and in the Alps of Dauphiné,—but does not say on what authority he makes this statement, and Gervais, in his 'Zoologie et Paléontologie,' does not mention it. As regards Greece, Blasius, in his 'Mammalia of Germany' (Brunswick, 1857, p. 455), says, "Belon found the Fallow Deer on the islands of the Grecian Archipelago"; but Erhard does not mention it in his 'Fauna der Cycladen' (Leipzig, 1858). V. d. Mühle, however, refers to it in his 'Beiträgen zur Ornithologie Griechenlands' (1844, p. 1).[**]

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[*] Gerard, 'Faune historique de l'Alsace,' Colmar, 1871, p. 328.

[†] Trutat et Cartailhac, Matériaux pour l'Histoire de l'Homme,' 1869, p. 299.

[‡] Robt. Hartmann, in Brugsch 'Zeitschrift für Ægyptische Sprache und Alterthumskunde,' Jahrgang ii., 1864, p. 21.

[§] 'Report on the Mammals of Palestine,' Proc. Zool. Soc. Lond., 1866, p. 66.

[||] 'Bulletin de la Société Géologique de France,' xxii., p. 542.

[¶] 'The Geographical Distribution of existing wild Mammalia of North-East Africa,' in the 'Berliner Zeitschrift für Erdkunde,' 1868, p. 252.

From the foregoing data the following conclusions may be drawn:—

1. In prehistoric times the Fallow Deer, with other extinct Mammalia, inhabited Lebanon, South Russia, Italy, France, Upper Austria, Wurtemburg, Baden, Saxony, Hamburg, and Denmark.

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[*] 'I Quadrupedi di Sardegna,' Sassari, 1774, pp. 104, 105.

[†] [Both Lord Lilford and Mr. Basil Brooke have observed the Fallow Deer wild in many parts of Sardinia.]

[‡] 'Fauna d'Italia,' parte prima (Milano).

[§] 'Berliner Zeitschrift für Erdkunde,' 1858, p. 101.

[||] [Lord Lilford has seen it wild in Central Spain, near Aranjuez.]

[¶] 'Histoire Naturelle,' tome vi., Paris, 1756, p. 170.

[**] [Lord Lilford has observed wild Fallow Deer in the province of Acarnani, in Greece; and in December, 1864, as we are informed by Mr. Sclater, the Zoological Society received a small dark-coloured Fallow Deer from the island of Rhodes.]

It seems also to have occurred in Switzerland and in England, as well as in Moravia and Lower Austria.

2. Within historic times it inhabited Egypt (tombs of Beni-Hassan) and Assyria; and, in the latter part of the middle ages, Switzerland and Alsace.

3. It is still found in a wild state in Asia Minor, North Africa, Sardinia, and apparently in parts of Spain and Greece, and perhaps still in the Cevennes and the Alps of Dauphiné.

4. The size and strength of the antlers, as well as the size of the skull, have in course of time degenerated. The skull and antlers of existing Fallow Deer are smaller than those of prehistoric times.

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ON THE NORTHERN RANGE OF THE FALLOW DEER IN EUROPE.

By W. Boyd Dawkins, M.A., F.R.S.*

In the interesting essay by Dr. Jeitteles many cases of the reputed discovery of the remains of the Fallow Deer are collected together to prove that the animal is indigenous in Northern Europe, and not imported from the south, as heretofore has been supposed by many able naturalists, such as Blasius, Steenstrup, Rütimeyer, the late Prof. Ed. Lartet, and others. These cases are accepted by Dr. Sclater without criticism, and are deemed by him to place the importation theory, as it may be termed, in the category of "ancient fables." The question, however, seems to me, after many years' study of the fossil and recent *Cervidæ* of this country and of France, a very difficult one, not to be decided off-hand, and certainly not without a strict analysis of the value of evidence such as that recorded by Dr. Jeitteles, whose method and facts appear to be equally in error.

The identification of fragments of antlers is one of the most difficult tasks which a naturalist can take in hand, and where there are several species of deer associated together in the same deposit, it is sometimes impossible to assign a given fragment to its rightful owner. For example, in the forest beds of Norfolk and Suffolk, and in the Pleiocenes of the Continent, there is a vast number of antlers which are ownerless, and which have completely baffled

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* Reprinted from 'Nature,' December 10th, 1874.

Prof. Gaudry, myself, and others for many years. It is, of course, easy for anyone to classify the flat antler as belonging to one species and the round to another; but the value of the determination depends upon the number of species living at the same time in the same place, possessed respectively of round and flattened antlers. In the pleistocene and prehistoric ages, there were four animals which had portions of their antlers flattened—the Reindeer, Irish Elk, true Elk, and Stag—to which, according to Dr. Jeitteles, must be added the Fallow Deer. In this particular case it is not only assumed that the flat-antler fragments belong to the last of these animals, but even the uncertain testimony of various authors, who had not critically examined the remains, which they record, in relation to the other species, is taken to prove the range of the Fallow Deer as far north as Denmark. The mere printed reference to the Fallow Deer is accepted as evidence, without, save in two cases, being verified by personal examination. The results of such a method of inquiry seem to me to demand most careful criticism.

The alleged cases of the discovery of Fallow Deer in Central and Northern Europe are as follows:—In Switzerland, it is stated to have been identified by Dr. Rütimeyer among the animals which had been used for food by the dwellers in the Lake villages; "although," he writes, "incontrovertible evidence of the spontaneous existence of this deer north of the Alps remains still to be obtained." In a list of the Swiss Mammalia which Dr. Rütimeyer was kind enough to prepare for me in 1873, the animal is altogether omitted from the pleistocene and prehistoric fauna. Thus, in the opinion of this high authority, it was not living in Switzerland in those early days. The animal is stated also (on the authority of Jäger in 1850) to have been found abundantly in "the caverns and turbaries as well as in the diluvial freshwater chalk of Wurtemburg." To this I would oppose the opinion of my friend Prof. Oscar Fraas, of Stuttgardt, from whose list of animals (sent to me in 1872) the Fallow Deer is conspicuous by its absence. The Reindeer is abundant in the caves of that region, and to it the flattened fragments of antlers may probably be referred.

To pass over the reputed discovery of the animal "in an old place of sacrifice" near Schlieben, in 1828, in which the discoverer himself remarks that "the subject requires further investigation," there only remain three other sets of fragments to be examined in Germany. First, those at Olmütz, which Dr. Rütimeyer considered to belong possibly to the Stag; secondly, an indistinct figure in the 'Ossemens Fossiles' of an antler attached to a skull found at Stuttgardt, which seems to me to belong to the Reindeer; and, lastly, a fragment of antler from Buchberg, which, taken along with the find at Olmütz, is the second of the two cases identified by Dr. Jeitteles. It is a museum specimen, which may very probably be liable to the same doubts as those which are entertained by Dr. Rütimeyer regarding the fragments from Olmütz. The teeth and bones from Hamburg are as likely to belong to the Stag as to the Fallow Deer.

The alleged instances of the discovery of the animal in this country and in France are equally unsatisfactory. The flattened antlers alluded to by Buckland and Owen belong either to the Stag or the Reindeer. Among the many thousands of bones and teeth which I have examined from the ossiferous caves of various ages, from refuse-heaps and tumuli, I have never seen any fragment which could be attributed to Fallow Deer, except in refuse-heaps not older than the Roman occupation. Nor is it found in Ireland till the middle ages. The late lamented Prof. Ed. Lartet, whom I always consulted on difficult questions such as these, believed that the animal was not living in Central and Northern France in the pleistocene or prehistoric ages, but that it was imported probably by the Romans.

The only evidence against this view is that afforded by an antler dug up in Paris and brought to Prof. Gervais along with stone celts by some workmen. It seemed to me when I saw it in 1873, in the Jardin des Plantes, not altogether conclusive, because of the absence of proof that all the remains were obtained from the same undisturbed stratum. I should expect to find such antlers in the refuse-heaps of Roman Paris, as in Roman London, and I should not be at all surprised if the remains of widely different ages were mingled together by the workmen, even if they were found in the same excavation. As examples of the necessity of guarding against this source of error, I may quote a recent lower jaw of Kangaroo Rat in the collection of my late friend Mr. Wickham Flower, which was stated to have been dug out of the brick-earth near Sittingbourne, along with the Mammoth and other pleistocene creatures; the bones of an Ostrich brought to Prof. Busk, along with Mammoth and Hippopotamus from the gravels of Acton Green; and lastly, the skeleton of Fallow Deer found in a bog not far from the

River Boyne above Leinster Bridge (Co. Kildare), along with a skull of Brown Bear (Scott, Journ. Geol. Soc. Dublin, vol. x. p. 151). This last case would have been taken as decisive that the animal lived in Ireland in prehistoric times as a contemporary of the Brown Bear, had not a silver collar round its neck proved that it had belonged to "a member of Lord Rosse's family."

From premises so unsatisfactory as those which have been examined, it seems to me very hazardous to conclude with Dr. Jeitteles that the Fallow Deer inhabited Northern and Central Europe in the pleistocene and prehistoric ages. The point, to say the very least, is non-proven. On the other hand, the non-discovery of certain relics of the animal by the many able naturalists who have examined vast quantities of fossil remains from those regions, implies, to my mind, the probability that the animal was not then in those parts of Europe. The value of negative evidence depends upon the number of observations, which in this case is enormous. To speak personally, I am in the position of a man waiting for satisfactory proof, holding that up to the present time the common Fallow Deer "has never been found to occur in the fossil state in Northern and Central Europe. The animal *ought* to be fonnd fossil in those regions; and it is not for want of looking that it has not yet been found.

For the sake of clearness, I have reserved the reference to other forms of deer, in the essay, for separate discussion. The *Cervus polignacus* of Pomel, from Auvergne, is an obscure form without definition, about which I will not venture to say anything. The *C. somonensis* of Cuvier, which I have carefully studied in Paris along with Prof. Gervais, is identical with the form which I have described from Clacton, Essex (Quart. Geol. Journ., 1868, p. 514), under the name of *Cervus Brownii*. The latter has been identified by Prof. Busk among the fossil remains from Acton Green. The typical antler of Cuvier's species differs from plate xvii., fig. 4 of *C. Brownii*, in the possession of a palm of four points, and in being broken and badly restored with plaster at the point where the third tine, *d*, of my figure joins the beam. Whether this kind of antler belongs to a well-marked variety of Fallow Deer or to a closely-allied species, I will not offer an opinion. It seems, however, safer to follow Professors Lartet, Gaudry, and most of the naturalists since the days of Cuvier, in keeping the fossil separate from the living forms, none of which present, so far as I know, a similar variation of antler. Till such an antler be found it is better to keep the animals apart in classification. And even if they be viewed as belonging to one species, they have only been met with in pleistocene deposits in this country and in France, and they may reasonably be taken as visitors from the south, such as the contemporary *Hippopotami*. In any case, I would submit that they do not afford satisfactory grounds for believing with Dr. Jeitteles that the present distribution of the Fallow Deer in Northern and Central Europe by the hand of man is "an ancient fable." It is undoubtedly an ancient belief, and it is one which can be proved to some extent to be true by an appeal to the records of history.

To enter into the question of the introduction of Fallow Deer into Northern Europe would far outleap the limits of an article. A reference to Lenz's 'Zoologie der Alten,' and to Neckham's 'Natural History,' will show to what an extent the wealthy Romans and mediæval barons were in the habit of importing wild and rare animals for the chase, as well as for the sake of mere curiosity.

Sir Victor Brooke, writing "on the existence of the Fallow Deer in England during pleistocene times" ('Nature,' 14th Jan. 1875), has shown pretty conclusively that the species called *Cervus Brownii*, which was founded by Prof. Boyd Dawkins (Quart. Geol. Journ., 1868, p. 514) upon some abnormal antlers dug up at Clacton in Essex,* is identical with *Cervus dama*, and that "under the former title the fact of the existence of the Fallow Deer in England during the pleistocene period lies in some degree obscured."

In this determination Prof. Boyd Dawkins himself has since expressed his concurrence ('Nature,' 21st Jan. 1875), remarking that Sir Victor Brooke's essay leaves no room for doubting that "the antlers named in the books *Cervus Brownii* and *C. somonensis* really belong to a variety of the living Fallow Deer," and he thanks the author "for having brought forward evidence on the point which is not presented by any of the large series known to me in the British and Continental Museums, and without which I could not venture to identify the fossil with the living form. He has supplied the missing link hitherto sought in vain, and thereby removed two synonyms from the bulky catalogue of fossil Mammalia."

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* Other specimens of this so-called species have been identified by Prof. Busk amongst the fossil remains from Acton Green.

But this has little to do with the question raised by Herr Jeitteles, namely, whether the Fallow Deer now living in Northern and Central Europe was introduced—like the horse into South America—by the hand of man.

On this point Sir Victor Brooke says (*l. c.*):—"Whether the Fallow Deer became extinct in Northern Europe before the advent of prehistoric man, or whether it continued to exist in these islands even at the commencement of the Roman occupation, are questions beside that of the truth of the "ancient belief" to which Mr. Boyd Dawkins shows such firm allegiance. "In either case the species may have been reintroduced by the Romans, a people whose magnificently lavish expenditure upon luxury and pleasure despised bounds."

While on the subject of Fallow Deer, it will not be out of place to call attention to the fact that the Fallow Deer of Western Persia (and therefore presumably the animal found in Western Asia, referred to by Herr Jeitteles) has been shown by Sir Victor Brooke to be a larger animal distinct from *Cervus dama*. He has described and figured it under the name of *Cervus mesopotamicus* (Proc. Zool. Soc. 1875, pl. xxxviii.) from specimens procured in the Provinces of Khurzistan and Luristan, in Western Persia, at the head of the Persian Gulf.

The peculiarity of this species lies chiefly in the shape of the horns, which are palmated immediately above the burrs, with a strong cylindrical beam rising from the posterior corner of the palm, and terminating in three well-developed tines. In other words, the cylindrical beam is *above* the palmation, or precisely the reverse of what obtains in *Cervus dama*.

Sir Victor Brooke says:—"In the development from the fan-shaped palm of a definite strong cylindrical beam, terminated with points, the new species presents a type of horn which stands unique amongst existing *Cervidæ*."

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ORNITHOLOGICAL NOTES FROM NORFOLK.

By Henry Stevenson, F.L.S.

June, 1876.

Pheasant.—A hen Pheasant hatched off her brood on the 2nd, in a nest made in the ivy growing against the east wall of Northrepps Cottage, about twelve feet above the ground, and brought off five chicks, two or three others being killed by the descent.

Hooded Crow.—One observed at Northrepps on the 22nd.

Spoonbill.—A single bird seen early in the winter on Breydon.

Rednecked Phalarope.—A male bird killed at Yarmouth on the 19th.

August.

Great Crested Grebe.—By a strange chance two old Grebes and three young ones were killed, at one shot, on Rockland Broad, on the 1st of August. The young were still in the down, with striped heads and necks, either a second brood or a late hatch, owing to the first nest being destroyed.

Turnstones and Sanderlings.—At Cromer, on the 15th, I saw a flock of Turnstones passing sufficiently near the beach to distinguish, with a glass, that they were all in nearly full summer plumage, as also was a specimen shot at Blakeney two days before. Sanderlings shot at the same time and place were adults in summer plumage.

Richardson's Skua.—A single bird was seen off Cromer as early as the first week in August.

September.

Nocturnal Migrants.—Heard the whistling of birds over the city for the first time this autumn about 8.30 p.m. of the 10th, apparently some small *Tringæ*, but very far off. Wind N.N.W., with a dark sky, but starlight.

Osprey.—One shot at Guist on the 24th. A male on South Walsham Broad on the 28th; and another at Sennowe about the same date. The latter had frequented the neighbourhood for some days.

Honey Buzzard.—An immature female was killed near Diss on the 16th. It was said to have struck down a Partridge, and both birds were secured.

Hobby.—One shot this month at Fersfield, near Diss.

Common Buzzard.—One shot at Horningtoft on the 22nd.

OCTOBER.

Little Stint.—Several shot at Salthouse during the first week in the month, and others on the 26th, from a flock of about forty.

Purple Gallinule.—A bird of this species, in full plumage, was shot on a stream near Pinckney, in West Norfolk, about the 10th of October: most probably an escaped bird, but a public notice of its fate in the local papers has failed to find an owner for it.

Mealy Redpoll and Siskin.—Several of these birds, which appeared altogether absent last autumn and winter, were netted near Norwich about the middle of this month, and I saw a single male Siskin which had been taken with some Lesser Redpolls as early as the second week in September.

Pigmy Curlew.—Several shot on Breydon during the first week of October.

Buzzards?—Two large Hawks seen at Northrepps on the 5th, supposed to be Honey Buzzards. A Rough-legged Buzzard was seen at the same place on the 30th.

Sky Larks Migrating.—A very large flock of these birds was seen at Northrepps going S.W. by W. on the 12th.

Magpie.—A single bird killed at Gresham, by Holt, on the 14th.

Peregrine.—A fine bird, in nearly adult plumage, was sent up to Norwich on the 30th.

Short-eared Owl.—A very unusual number of these autumnal migrants appeared in various parts of the county between the 20th and 31st of October, at which time I saw between twenty and thirty specimens in our birdstuffer's hands. One bird is said to have had the remains of a Great Snipe in its stomach.

Shore Larks.—These annual winter visitants, as they may fairly be termed now, on the Norfolk coast, made their appearance at Yarmouth this month in a large flock, of which five, three males and two females, were sent to Norwich on the 27th. Another flock is said to have frequented the beach and "backwater" at Salthouse.

Woodcock.—These birds were plentiful towards the end of the month, upwards of twenty were hanging for sale in our fish-market on the 28th.

NOVEMBER.

Lapwing.—Two large flocks of these birds were seen at Northrepps on the 1st, going west, and on the 4th large numbers were observed passing W.N.W., and from their cries it would seem that their flight continued also during the night of the 4th, or at least some part of it. About the 15th immense flocks of Lapwings and Golden Plovers were observed in the same neighbourhood at Beeston Regis, and up to the close of the year the numbers of both Golden and Gray Plovers reported on the western side of the county, at Lynn, have been very unusual.

Peregrine.—One shot at South Walsham early in the month.

Bittern.—A single example was killed somewhere in the county on the 4th, and one at Beccles about the middle of the month.

Rough-legged Buzzard.—An immature bird killed at Sidestrand, near Cromer, in the first week of November, was no doubt the same observed on the 3rd at Sheringham, mobbed by a Hooded Crow, and on the 4th at Northrepps, all closely adjoining. I have also seen three other specimens, all immature, killed in Norfolk during this month.

Wood Pigeon.—On the 3rd of this month, and again on the 12th, 13th, and 14th, very large flocks of Wood Pigeons were observed at Northrepps early in the morning, apparently coming in from the sea.

Sea Eagle.—A single bird was seen at Sheringham, and subsequently at Beeston Regis, about the 9th of this month.

Common Guillemot.—On the morning of the 2nd a Common Guillemot was taken alive in the garden of the Rev. Mr. Norgate, of Sparham, near Norwich. It was found flapping along the walks, apparently fatigued, but uninjured. There had been much wind a night or two before from the west and northwest, but on the previous night by no means sufficient to account for its appearance, so very far inland, by the supposition that it had been caught in a gale, and so involuntarily carried away from the coast.

Honey Buzzard.—Mr. Baker, of Cambridge, informs me that on the 6th he received a Honey Buzzard for preservation, from Fordham, near Downham Market, in Norfolk; one from Caxton, in Cambridgeshire, on the 8th; and one, same time, from near Sudbury, Suffolk—all young birds.

Snowy Owl.—About the 2nd or 3rd a fine specimen, which had evidently been previously wounded, was shot by Lord Leicester's keeper in the Burnham Overy marshes, the same recorded in 'The Field' of November 18th.

Gray Phalarope.—A bird fast assuming its winter plumage was killed early in the month.

Purple Heron.—A young bird of the year was killed at Ranworth on the 10th. It had been previously shot at and wounded in the leg.

Purple Sandpiper.—An adult specimen was shot at Yarmouth on the 8th, another later in the month at Blakeney, and a young bird at the same locality on the 31st of October.

Raven.—On the 26th two Ravens were seen coming over the sea at Overstrand, near Cromer. Mr. N. F. Hele also records in 'The Field' of November 24th having seen three Ravens at Aldborough.

Sclavonian Grebe.—A bird in full winter plumage was shot at Ranworth about the 14th.

Hawfinch.—The Rev. E. T. Frere, of Burston, near Diss, informs me that during this month about thirty Hawfinches were killed in the same garden, at Diss, where this species appeared in such numbers two years ago, attracted no doubt by the number of yew trees. He fortunately succeeded in putting a stop to this useless slaughter.

Lesser Spotted Woodpecker.—A bird of this species was killed in the same garden above referred to, at Diss, on the 24th.

DECEMBER.

Common Buzzard.—A rich brown-plumaged bird was brought up to Norwich on the 2nd.

Rough-legged Buzzard.—One shot at Ditchingham on the 1st, another at Northrepps in second year's plumage on the 24th, and two near Yarmouth between the latter date and the 29th—all immature birds. On the same day an unusually dark-coloured Buzzard, supposed to be of this species, was seen at Northrepps.

Gray Shrike.—One of these birds was killed in the county this month, and two others in November.

Sea Eagle.—One recorded in 'The Field' of January 6th, 1877, as killed on the Westacre estate, near Swaffham, Norfolk.

Snipe and Wild-fowl in the Early Winter.—The beginning of November was remarkable for the very unusual number of snipe which were met with at that time on our broads and marshes, and large bags were made by those fortunate enough to hear of their arrival in time to take advantage of it. From fifteen to five-and-twenty couples in a day were, I understand on good authority, killed in favourable localities, and this not only in the Broad District, but in the salt marshes on the coast: these birds, according to some accounts, literally poured in upon us, just in advance of the sudden change to frost and snow, which commenced on the 6th and lasted till about the 11th or 12th. From that time, as was the case last year under very similar circumstances, both snipe and fowl have been scarce, the weather remaining open, whilst these early flights have passed on to the south, to return only in March on their way northwards in Spring. Early in the month wild-fowl were reported as unusually plentiful at Salthouse, and on the 9th wild swans were seen off Blakeney; and about a week later others were seen out at sea, off Cley Harbour. On the 9th a flock of over two hundred wild geese flew over Northrepps, in a N.W. direction, flying high and making much noise, and about the same time I learn that fowl in unusual numbers were heard passing over Breydon, near Yarmouth, but the nights were too dark for the gunners to do anything with them. Inland, and within a mile or two of Norwich, wild swans were seen on the wing, and a great many fowl frequented the low meadows both morning and evening. The great abundance at the same time of Golden and Green Plovers, has been already referred to, but Fieldfares and Redwings have not showed in force this winter, nor have any of our smaller resident species suffered privation, owing to the brief duration of frost, and the remarkable mildness and damp of the season generally.

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OCCASIONAL NOTES.

On the Breeding of the Otter.—Although Otters, like other animals, appear to breed most commonly in the spring, yet instances of the capture of young Otters that must undoubtedly have been born during the autumn seem to be nearly as common, and I think a series of instances would show that there is no month in the year during which a newly-born litter could be considered extraordinary. On November 12, 1873, a male cub, picked up in the Isis a few days before, weighed (at a guess) barely 2 lbs.: he had milk canines and molars, but no incisors cut (it may be worth mentioning that he did not lose the first of these milk canines until a day or two, at most, before January 22); he had probably not many days before emerged for the first time from the nest, and if it be correct, as stated by Brehm ('Illustrirtes Thierleben') and quoted by Lilljeborg, that the young are suckled by the mother for a couple of months in the nest before they are taken out and instructed by her in the art of catching fish, nine weeks would be somewhere about his age. Two other cubs, male and female, were captured a few days after the first, making a probable total of three to the litter. On March 31, in the same year, a female cub, picked up about the 20th, in Wales, weighed 2¾ lbs.; she had incisors, evidently not long cut. Two cubs, weighing about 3 lbs. each, were killed on October 24, 1875, while trying to scramble up a willow-tree in the floods near Oxford. Two others were caught from a fishing boat when swimming with their mother in the sea, off Megavissy, Cornwall, on February 4th, 1873 (as reported in 'Land and Water' at the time); one of these, which I found lying dead in its cage at the Zoological Gardens on the 24th, weighed then, at a guess, about 3½ lbs. On July 10th of the same year I caught a young female Otter in the Thames, weighing somewhere about 5 or 5½ lbs., and on comparing it with the specimen mentioned above as received from Wales in March of this year, it appeared to be from a month to six weeks younger. Two cubs were caught with Major Hill's otter-hounds in Wales in 1870; one, a female, weighed on July 23, 5 lbs. 14 oz. Four young Otters, from different localities, appeared to be of much the same age—averaging about 9 lbs.—(one weighed 8 lbs. 6 oz., and was 3 feet 2 inches long, another 9¼ lbs., length 3 feet 1 inch) in the months of June, August, May, and December. The friend who sent me these wrote me word that he had tried to procure a cub, caught a few days previously, which was not much more than half the size of the specimens sent. The mother of another of these had, according to the fisherman who shot her, three teats used, as if that were the number of young in the litter. Three small cubs were killed, together with their mother, in their nest under a stack of osiers on one of the eyots on the Thames: I do not know the time of year. A female Otter, trapped on the

Thames, was found by the man who skinned her to contain three young; I regret that in this instance, as in two or three others of single cubs being picked up, I have no note of the time of year. One of the two Otters now in the Zoological Gardens, received in February last, must undoubtedly, I think, have been born during the previous autumn. Two female Otters, which I have in captivity, come in season pretty nearly every month, and would, I believe, pair at almost any time of year, especially perhaps November, but unfortunately I cannot get hold of a male; the only individual I ever possessed (the first cub mentioned) died from inflammation of the lungs before he was full-grown.—ALFRED HENEAGE COCKS (5, Radnor-place, Hyde Park, W.).

HYBRID BETWEEN THE ENGLISH HARE AND THE SCOTCH HARE.—At a recent meeting of the Glasgow Natural History Society Mr. Lumsden exhibited a Hare, hybrid between *Lepus timidus* and *Lepus variabilis*, which was shot in December last near Dumbarton moor, where blue Hares were turned out a few years ago. He remarked that "the editors of the new edition of Bell's 'British Quadrupeds' do not seem to have been at all sure of hares of this description occurring in this country, and state that hybrids are reported to be known in Switzerland, but that the statement requires further confirmation. It is reported, however, that they are not uncommon in some places in Perthshire." Mr. John Cordeaux, of Great Cotes, Ulceby, informs us that when shooting in Perthshire last September, he killed a hare which he had no doubt was a cross between *Lepus timidus* and *Lepus variabilis*. This example, which he compared the same day with pure specimens of both species, exhibited very distinctly a mixture of the colours of both parents, that of the Common Hare predominating. It differed, also, in some respects from the Mountain Hare, being generally larger, with larger head, larger ears, and broader forehead. The head keeper on this moor, an experienced man, stated that there was no doubt whatever about the inter-breeding of the two species, but that the progeny was infertile. —ED.

A FRESHWATER BREEDING-HAUNT OF THE SANDWICH TERN.—A correct list of the breeding stations of some of our rarer sea-fowl would be both interesting and useful to those who are fond of studying the habits of our native birds; for in many instances the localities chosen are not those where the casual observer might be induced to look for them. Few, indeed, would expect to find the Sandwich Tern nesting on a little moorland lough some miles from the sea, and totally unconnected with it; yet such was the locality selected by the Sandwich Terns frequenting Killala Bay and the estuary of the River Moy. On the 7th of April, 1851, near the island of Bartragh, I first became acquainted with this beautiful Tern. Having previously resided in the South of Ireland it was quite unknown to me, and when the attention of my brother and myself was first attracted by its very peculiar cry (which if once heard can never be mistaken or forgotten) we were very much puzzled, as for a long time we could not make out what bird uttered it, or from what direction it proceeded. The sound appeared to come from all points of the compass, yet no birds appeared in sight: after some time we chanced to look upwards, and were only just able to perceive some birds wheeling about and soaring at an immense height, and all the while screaming loudly. This wild flight and strange cry, so unlike that of any other bird we knew, induced us to watch them closely, and after some time they gradually lowered their flight to the water, and we then saw that they were some species of Tern. We got into our boat, and succeeded in shooting a couple, and found they were the Sandwich Tern. This peculiar habit of soaring to a great height (almost out of sight) and wheeling about in wide circles, occasionally chasing each other and screaming loudly, is more often to be witnessed early in the season, before they begin to sit, although occasionally in autumn a pair may be seen acting in a similar manner, but almost invariably on fine bright days. As these Terns remained feeding about the bay and estuary, we were most anxious to find their breeding ground, but although we made many enquiries and searches we were unable to discover it. About the time we supposed the females were hatching, the male birds were daily seen flying inland towards Lough Conn, with sand-eels in their bills to feed their mates. Lough Conn, however, was visited twice without our seeing any trace of the Sandwich Terns, the only members of the *Laridæ* met with being Black-headed Gulls and Common Terns. Our search for the breeding haunt having thus failed I gave it up for a time, but in May, 1857, I was told of a small lough upon which a number of small gulls bred, and which is situate near the residence of the late Mr. Gardiner, of Cloona, two miles from the town of Ballina, and about three miles from the estuary. This lough, nearly surrounded by a bog, is about twenty or thirty acres in extent, and has a wooded island in the centre, with a quantity of reeds and bulrushes at one end. On visiting the spot I found a large colony of Black-headed Gulls breeding amongst the reeds, and a smaller colony of the Sandwich Terns located on a low flat mud-bank scarcely above the level of the water. Some of these Terns had no nests to speak of, but had laid their eggs in a slight depression of the soil, thinly lined with a few blades of dried grass, and (as well as I can remember now) I think three was the average number of the eggs in each nest. When returning I brought five or six of the eggs back with me, and at that date (the last week in May) some were nearly hatched, and too far advanced for blowing, which shows that this species breeds much earlier than the smaller terns. The following winter and spring being unusually wet, the level of the lake was raised so high as to cover the mud-bank upon which the Terns had had their nests, and as the bank continued under water during the summer of 1858, the Terns deserted this lake altogether. They have now moved to the little moorland lough of Rarouem, situated midway between Ballina and Killala, and within sight of the high-road between those towns. This lough is considerably larger than that of Cloona, but is nearly surrounded by bog, with very swampy shores, and a large quantity of reeds growing on the margin: in some places these reeds grow far out towards the centre, where there is a small circular island about twenty yards in diameter, whereon a large number of Black-headed Gulls make their nests, as they do also among the reeds, but the Terns have theirs on a bare part of the island, a little away from those of the Gulls. This lake, with the adjoining land, is the property of Sir Charles Knox Gore, who, with the spirit of a true naturalist, strictly preserves it, and does not permit either Gulls or Terns to be disturbed: last season he had the bushes and long grass cut off the island, in order to give the birds more space for their nests, so that now, being well protected, there is every likelihood of this beautiful species increasing every year. When visiting this lough in June, 1876, it presented a most pleasing sight from the number and variety of the birds frequenting it; the Gulls and Terns sitting on their nests, the male Terns continually coming from the sea with sand-eels to feed their mates, Wild Ducks, Teal, Coots, and Waterhens swimming in and out amongst the reeds, Ring Plovers running along the shores of the lake, and Black-headed Buntings and Sedge Warblers flitting about the stunted bushes which grow on the drier parts of the swamp. Altogether it presented as pretty a picture of lake life as could well be imagined, and one of which a naturalist could never tire. The Sandwich Terns arrive in the bay and estuary of the Moy much earlier in the spring than the smaller terns, generally making their appearance between the last week of March and the middle of April; sometimes, however, I have seen them arrive as early as the 20th of March, and as late as the 26th of April.—ROBERT WARREN (Moyview, Ballina).

ON THE HABITS OF THE GOLDEN EAGLE.—I have never known the Golden Eagle to eat fish, even when quite fresh, much less in a putrid state. The Sea Eagle, on the contrary, is a foul feeder, and will eat all kinds of fish; he also watches the fords over which salmon leap in ascending rivers, and often makes them his prey. Few have enjoyed better opportunities than I have for studying the habits of the Golden Eagle, for they frequent the hills around my house, and for the last twenty-four years I have had a tame one, which seems to attract the wild ones, who sometimes sit on the top of her cage. In 1875 she laid two eggs, and last year four. She is much attached to me, and will allow me to handle her in any way. So far from being afraid of anything alive, I may state that she has killed a Peregrine Falcon, which was so tame that I allowed it to fly about, besides several Merlins, Gray Crows, and other pets that I had, which went into her cage attracted by the meat. Only last month she killed a large cat in the same way. I could furnish many other anecdotes of her did space permit. The mode of hunting by the Golden Eagle is most interesting to watch. Generally speaking two of these birds hunt together, a hare being the favourite prey. When the hare is started one of them follows it as near the ground as possible; the other poises in the air, or as a falconer would say "waits on," and watches intently. If a rock or anything else intervenes, and the bird in pursuit loses sight of the hare, the other at once stoops and takes up the running; the first then "waits on," and so on. The hare has little chance of life unless there is a hole in which to hide.—William Pike (Glendarary, Achill Sound, Co. Mayo).

Notes from the West of England.—A Rough-legged Buzzard is reported to me as having been trapped on Exmoor this winter; it is described as having been very light-coloured in its plumage, so may prove an adult. At the beginning of November a Green Sandpiper made its appearance by a warm drain close to my house, and was to be noticed there daily for some six weeks, when it disappeared, and I feared it had been shot; however, after a fortnight's absence it returned, and one day I flushed from the same drain a smaller Sandpiper, which seemed tamer than the other bird, rising with a feeble "weet," and flying over the field at a short distance from me. I am pretty positive that it was a Wood Sandpiper. About Christmas a Curlew Sandpiper was shot on the moors a little to the east of Taunton, and is, I should judge, in almost complete winter dress, in which state it is but rarely obtained in this part of the kingdom. It is not so gray on the back as the Dunlin in its winter plumage, and still shows many of the crescentic markings which characterize the young birds shot in September and October; but all the under parts from the bill to the vent are pure white, and the upper wing-coverts are very hoary, being dark gray spotted with white, not a little resembling the summer plumage of the Wood Sandpiper. Whilst on the subject of Sandpipers I may add that last summer, when fishing on the moors, I saw a Common Sandpiper rise a few feet into the air from off a bank adjoining the stream, and while it rose and slowly descended again it warbled a very agreeable little song; a clump of furze separated me from the bird and the stream by an interval of a few feet, so that the bird did not see me, while I was sufficiently near to see it clearly and to catch what was to me a hitherto unknown song. It is on record that the Wood Sandpiper also pipes a few pleasing notes.—Murray A. Mathew (The Vicarage, Bishop's Lydeard).

Rare Birds on the Exe.—An adult specimen of the Little Gull (*Larus minutus*), in winter plumage, which had been shot near Woodbury, was shown to me in the flesh on the 29th November last. On the 12th January two immature specimens were shot on the Exe, below Topsham, by Mr. Douglas Hamilton and Mr. Benjamin Cleave, who have kindly presented them to this Museum. Another immature specimen has also been shot within the last few days at Turf, on the Exe. This species has occurred three times previously on the same river, once at Teignmouth, twice in Torbay, and twice at Plymouth. A Great Crested Grebe (*Podiceps cristatus*) in winter plumage was shot at Powderham, on the Exe, on the 15th January, by Mr. A. K. Hamilton, who has presented it to this Museum; it is not common on the Exe, but has been obtained in various stages of plumage, principally in the early months of the year. On the 18th December last a young male Long-tailed Duck (*Harelda glacialis*) was brought to me in the flesh; it had been killed on the Exe. We have now a fine series in this Museum killed on this river: an adult male in summer plumage (1847), an adult male in winter plumage, a young male (1851), another young bird (1865). A small flock of these ducks was seen on the Exe in November, 1867.—W. S. M. D'URBAN (Albert Memorial Museum, Exeter).

ROOKS ATTACKING ACORNS.—Your remarks on Rooks attacking acorns (page 21) reminds me of what came under my observation some twenty years since, when residing in Morayshire. I made some notes on the subject at the time, and now give an extract, thinking it will go far to prove that the Rooks you saw carrying off acorns were doing so to get at the grubs. The past autumn having been unusually mild, the thermometer in November frequently as high as 55°, grubs and worms were unusually abundant, consequently Rooks could not have been pressed by hunger to feed on acorns. Seeing that the Nuthatch breaks the hazel-nut, we need not wonder at the Rooks breaking the shell of the walnut. The note to which I refer is as follows:—"November, 1858. Observing a number of Rooks flying in and out of a fir plantation, and remarking that they were more than usually clamorous, I was induced to watch them; I then found that on emerging from the wood they held in the beak something of considerable size, but what it might be I could not imagine. Snails were thought of, but it being late in November they were hybernating, so I endeavoured by a closer inspection to ascertain what could have been found of an eatable kind in the fir-trees, but the closely-matted branches effectually screened them. On leaving the wood they were observed to alight on an open space dotted with furze, under cover of which I was enabled to watch them unobserved; I then saw that what they were pecking and tearing at were fir-cones; the operation over—and it took but a few minutes—they returned to the trees for a fresh supply. On examining several of the cones strewn over the ground in different stages of decay, a grub, or maggot, was found in some of them near the core, showing clearly on what the Rooks had been feeding."—HENRY HADFIELD (Ventnor).

ROOKS ATTACKING ACORNS.—Like Mr. R. M. Barrington I had never noticed that acorns were not included by the authorities on British Birds in the category of the Rook's food. I have repeatedly seen them eat acorns, but was under the impression that they eat all but the outside shell. Rooks and Carrion Crows begin to come to our walnut trees on or about the 28th September every year. They wrench off the nut, and sometimes carry it to a great distance before they commence to eat it. They generally take it to the middle of some large field, and holding the nut down firmly by one claw, proceed to peck it open by aid of their powerful beak. It is impossible to make one drop the coveted morsel when flying over, however much they are frightened. I never saw them bury a walnut, as related by Mr. Jesse.—C. Matthew Prior (Bedford).

Curlews breeding near Salisbury.—I can quite credit the paragraph in 'The Marlborough Times,' mentioned at page 38, concerning the true Curlew (*Numenius arquata*) breeding occasionally on the Aldbourne Downs. One or two pairs have bred regularly on the downs some seven miles from Salisbury for many years past. My little boys taking a great interest in Natural History, I asked a friend, in the spring of 1875, to procure for me a pair of the eggs of the Stone Curlew, or Thick-knee, which bird breeds annually with us. He did so, but they unfortunately arrived when I was away from home, and were broken. He very kindly sent me a second pair on May 25th,—rather late in the season for them,—and told me whence he had procured them. On making enquiries of a person he mentioned, I was told that they were not uncommon, and that some Curlew's eggs could be obtained from the same downs if I wanted them, as one or two pair bred there every year. I was surprised at hearing it, but size and colour and shape of the egg were described so accurately that I was convinced of the truth of their doing so. Last year (1876) I asked the person to look out for me and procure me some; but this spring none were found, it being the first season they had missed breeding there. Upon this I referred to Meyer's book on 'British Birds and their Eggs,' and asked the person to point out to me which eggs were meant when "Curlew's eggs" were spoken of; and the right egg was pointed out without the slightest hesitation. I have not the least doubt of the fact of these birds breeding on the downs, as the Thick-knee's eggs are comparatively common about here, and could not be mistaken for the eggs of *Numenius arquata* by one who was perfectly acquainted with the eggs of both species.—A. P. Morres (Britford Vicarage, Salisbury).

Variety of Sand Martin.—This species breeds not uncommonly in several places in the neighbourhood of Ringwood, such as old gravel-pits or railway banks. Near one of the latter situations I have often sat for hours watching their untiring and happy motions and listening to their twittering notes. Last season, during their nidification, I noticed a peculiarly coloured individual flying amongst its darker relations—in fact, it seemed to be snowy white, and was consequently very conspicuous. On the 6th of

September, however, I saw a specimen which had been killed as it was flying over the river, but it was terribly battered with large shot, its head being smashed and almost severed from the body. Its general colour was a pale yellowish white, the body tinged with gray, and the feathers of the wing-coverts were each bordered with bright rust-colour, so that it would have been a peculiar variety if it had been worth preservation. This was probably the bird I had watched during the summer, for although the man who shot it said he saw another at the same time similarly coloured, no such specimen was seen afterwards.—G. B. CORBIN.

GRAY SHRIKE AND GOOSANDER IN COUNTY ANTRIM.—A female specimen of the Great Gray Shrike was shot at Carnmoney, County Antrim, on January 13th; the stomach contained fragments of the bones of some small bird, but of what species I could not determine. On the 9th of the same month a young male Goosander was killed ou the six-mile water near Randalstown, and came into my possession the following day.—THOMAS DARRAGH (Belfast Museum).

[In Thompson's 'Birds of Ireland' the Goosander is characterised as "probably an annual winter visitant to Ireland, but in very limited numbers; and chiefly to fresh water."—ED.]

OWLS WASHING.—I have a pet Barn Owl flying at large in the yard, and on several occasions I have seen him wash in a tub of water. I have also a Long-eared Owl, but never knew him to wash, although he sits outside in rain and wind both night and day, and seldom seeks shelter or even a dark corner; it is quite the contrary with the Barn Owl, as he does not seem to like the light, and seeks the cellar in the day-time. It would be of interest to me to know if others have observed Owls washing, and if so, of what species?—THOMAS DARRAGH (Belfast Museum).

[That Owls have no antipathy to water is evidenced by the fact that they have been observed to catch fish, and in their love of bathing, when opportunity serves, they probably do not differ from other birds of prey.—ED.]

REMARKABLE VARIETY OF THE WILD DUCK.—On the 11th January a strange specimen of the Mallard was submitted to my inspection. The head was yellowish green, the white collar absent from the neck, very slight traces of the rufous band on the breast, speculum ashy black instead of brilliant green. It was shot below Topsham, on the Exe, a day or two before I saw it.—W. S. M. D'URBAN (Curator, Albert Memorial Museum, Exeter).

[Our first impression on reading this note was that the bird must have been a drake in the plumage of a duck, still undergoing that remarkable seasonal change of plumage to which we know the Mallard is liable at the close of the nesting season. But looking to the date at which it was obtained, this could scarcely have been the case. The Mallards begin to assume the duck's plumage about the third week in May, and retain it until August, when they again undergo a gradual change towards their own richly-coloured plumage, which is fully re-assumed about the second week in October. The bird in question, therefore, ought to have been in the full plumage of the drake at the date named, and it must accordingly be regarded as an abnormal variety, if our correspondent has satisfied himself that it is not a hybrid, or an escaped wanderer from some poultry yard.—Ed.]

Herons near London.—One morning in December, 1876, a Heron was seen by Mr. F. W. Denny fishing in his piece of water in Hanover Park, Peckham.—Henry F. Bailey.

[The spot indicated is about four miles from Hyde Park Corner. On the 10th February last we saw a solitary Heron at Kingsbury Reservoir, which is about six miles from Hyde Park Corner as the bird flies.—Ed.]

Glaucous Gull on the Exe and Teign.—An immature specimen of the Glaucous Gull (*Larus glaucus*) was shot on the Exe on the 20th January. It had been seen for a fortnight previously, and had been frequently fired at. Another specimen, also immature, occurred on the Teign about the same time. The legs and feet and base of the bill were light pink in the first-named specimen, which is now in this Museum.—W. S. M. D'Urban (Albert Memorial Museum, Exeter).

Singular Nest of the Blackbird.—On the 13th May, 1875, I came across a Blackbird's nest, on the ground, that must have wasted the time and tested the patience of the builders very considerably. It was in the bottom of an old lime quarry, placed on a sloping bank, with too little solid foundation, and the materials of the nest kept slipping down the side of the bank with their own weight, till a queue nearly two feet long and five inches wide was made. At the head of this it was at length triumphantly completed, and on the 17th May contained three eggs.—F. S. Mitchell (Clitheroe).

Occurrence of the Spinous Shark off Plymouth.—On January 25th a Spinous Shark (*Squalus spinosus*), seven feet six inches in length, was captured in a trawl-net off Plymouth, and on being opened the stomach was found to contain four Picked Dogfish (*Acanthias vulgaris*). Although considered a rare fish this is the third obtained off Plymouth within the last eight years.—John Gatcombe (8, Lower Durnford Street, Stonehouse, Plymouth).

Spinous Shark in Mount's Bay.—On the 17th January a Spinous Shark was taken on a hook and line off Mousehole Island, in Mount's Bay, just where I observed the first specimen was captured about eight years ago in a similar way. The present specimen was eight feet long, but I had no time to take details. It was too much hacked about the head and gills for preservation. This makes the fourth Mount's Bay specimen that I have seen in eight years.—Thomas Cornish (Penzance).

TADPOLE FISH OFF PENZANCE.—A small specimen of *Raniceps trifurcatus* has been captured here. It was taken in a waterhole left by the receding tide, and was captured owing to its pugnacity, which may be common to the species or peculiar to the individual. It was heard splashing about in its hole, a stem of seaweed was thrust in, and the fish laid hold of it and was dragged out by it.—THOMAS CORNISH.

ASTERINA GIBBOSA ON THE COAST OF BANFFSHIRE.—While walking along the shore at Banff with some friends in May last, I noticed a lot of rubbish which the fishermen had taken from their lines, and knowing from experience what treasures are sometimes to be met with in such places, I at once began to explore on the chance. The first two heaps yielded nothing new or of much importance; but in the third I was well repaid by the discovery of a fine specimen of the above-named little Starfish, *Asterina gibbosa*. I am not aware of the exact range of this species, having no book on the subject, nor do I know if it has hitherto been detected as occurring in the Moray Firth. This I know, however, that the specimen here alluded to is the first I have ever met with. If I may offer the advice of an old man, let me urge upon your readers who live by the sea and take an interest in marine forms of animal life, never to pass the spots where the fishermen clean their lines without first searching them well. They will not always be successful, that is not to be expected; but let them persevere, and they will sooner or later be rewarded for their trouble.—THOMAS EDWARD (Banff).

[There seems to be no previous record, so far as we have been able to ascertain, of the occurrence of *Asterina gibbosa* on the east coast of Great Britain. In Forbes' 'British Starfish' it is said to be "apparently confined to the western and southern shores of Britain," and the localities mentioned are Cornwall, Isle of Man, Ross-shire, Herm, Channel Isles, and all round the coast of Ireland. To these localities, Gray, in his 'Synopsis of Starfishes,' adds Plymouth Sound. The habitatat now assigned to it by Mr. Edward, therefore, is new, and the fact is interesting as establishing the occurrence of this starfish much further to the north and east than has hitherto been supposed.—ED.]

PROCEEDINGS OF SCIENTIFIC SOCIETIES.

LINNEAN SOCIETY OF LONDON.

January 18, 1877.—Prof. ALLMAN, President, in the chair.

Mr. Thomas Routledge and Mr. Samuel David Titmas were balloted for and duly elected Fellows of the Society.

The "Amphibious and Migratory Fishes of India" was the title of a very able communication by Dr. Francis Day, a well-known authority on all that relates to the fishes of the region in question. He laid down the following propositions, and by facts endeavoured to substantiate them:—(1) That there are fishes in Asia which normally respire atmospheric air direct; (2) that these fishes possess respiratory organs having a lung-like function, and which is distinct from the gills; (3) that they are essentially amphibious, inasmuch as the accessory organs receive venous and return arterial blood into the general circulation without passing through the branchiæ or gills; (4) that this accessory respiratory sac is certainly not homologous with the swim-bladder of fishes, but is most probably so with the respiratory sac of amphibious reptiles. He gave numerous instances of forms which respire air direct, and can live for long periods after their removal from water, being but little affected by a bandage being placed round their gills preventing the use of these organs. He observed that in the *Saccobranchus* both a respiratory sac and a swim-bladder co-exist—the one along the muscles of the back, the other more or less enclosed in bone but possessing a pneumatic duct. The migrations of fishes at the commencement of monsoons are due to two causes—breeding purposes and a search for food. The aërial respiration of certain amphibious fishes he regards as a provision to enable those forms to migrate through moist grass and muddy channels. As soon as the rains set in and vegetation starts afresh, insects, worms, land mollusks and other invertebrates are revivified, and with this the fish restlessly seek change of locality and diet, in their search for quarters where these abound. As regards the sudden appearance of fish supposed to have fallen from the clouds, these are occasionally met with in a semi-decomposed state, and are doubtless carried by whirlwinds and storms from shallow waters into mid-air, whence they fall again in most unlooked-for situations. In other innumerable instances the apparently inexplicable profusion of fish in moist spots away from water is accounted for by the remarkable retention of vitality possessed by the mud-loving species, which emerge from torpidity into active life as soon as the waters return.

The Jelly-fish have lately been made the subject of study by Mr. J. G. Romanes, who read a second notice "On Varieties and Monstrous Forms of *Medusæ*." He expressed surprise that among the group of Jelly-fish, at least the naked-eyed groups, with their low grade of organization and proneness to exhibit phenomena of budding or germination, examples of monstrous and misshapen forms are comparatively rare. In those cases met with by him, especially in the common *Aurelia aurita*, the deviations from the normal type always occurred in a multiplication or suppression (*i. e.*, abortion) of entire segments. This affects the segments of the umbrella in a remarkably symmetrical manner, whilst the ovaries and manubrium, to a certain extent, may or may not be implicated.

Feb. 1, 1877.—GEORGE BENTHAM, F.R.S., Vice-President, in the chair.

The following gentlemen were elected Fellows of the Society:—Messrs. George Boulger (Cressingham, Reading, Berks), Alfred S. Heath (Primrose-hill Road, N.W.), and William Meller (Sewardstone, Woodford Green, Essex).

Mr. Alfred W. Bennett exhibited and made some remarks on specimens of insects, illustrating mimicry. These species (*Vespa* and *Asilus*) were captured in Syria by Mr. N. Godman.

Curious and interesting examples of double Anemones, and of unusually large oak-leaves gathered near Croydon were shown and commented on by Mr. Samuel Stevens.

Sir John Lubbock, Bart., M.P., then proceeded to read the fourth part of his "Contributions on the Habits of Ants, Bees and Wasps." In this communication his experiments and observations related exclusively to different species of ants, and in the main were a continuation, though with considerable ingenious modifications, of his previous inquiries, to test the intelligence of these insects. In one instance, he filled a saucer with water, put a block of wood therein, and from the top of the block a horizontal wooden rod leading to a glass cell containing abundance of larvæ. A strip of paper was then placed as a kind of inclined plane between the latter and the nest. Another larger block of wood of an ┌ shape, the horizontal arm of which overhung the glass cell with the larvæ, and merely separated by three-tenths of an inch from the latter, this space being occupied with a paper slip hanging right on to the larvæ; thus ┌┐: there were two direct routes from the nest to the larvæ, which specimens of *Lasius niger* took advantage of and for several hours carried off larvæ from the cell. But no sooner was the three-tenths of an inch interval left open than the ants were foiled in access to the larvæ, and neither were they intelligent enough to drop three-tenths of an inch or congregate *en masse* to the same height, and thus form a connection whereby their companions could get at the desired food-store. Industry was conspicuously shown by one individual, which Sir John used to place in solitary confinement in a bottle as he left home for the day; but when liberated on his return home the creature immediately commenced labour. On one occasion, after a week's absence, the ant was no sooner released than it bravely entered on its larval-gathering propensities. It seems from other experiments that ants in difficulties within sight of their companions are by no means always assisted or relieved, any store of honey or other food having attractions of far greater interest for them. On putting some specimens under the influence of chloroform, little or no notice was taken of their insensible companions; in some cases even their friends pushed them out of the way; the tendency was to let their friends lie, but strangers were dropped over the edge of the board. It seems that to get ants properly intoxicated with spirit, for experimental purposes, is no easy matter, some recovering too quickly, and others remaining so thoroughly drunk as to come under the rank of incapables. The sober individuals appear exceedingly puzzled at finding their friends in such a condition. As a rule, they picked them up and carried them to the nest, whilst strangers they threw into the water and drowned. In some instances, however, confusion ensued, for a few of the strangers were carried to the nest and friends were thrown into the water; but they did not return to the rescue of their friends, and occasionally they discovered the strangers in the nest and turned them out. Other interesting experiments were made to test the ants' recollection of friends, and Sir John expresses surprise that the ants of an entire nest evidently recognise and know each other. Even after a year's separation, old companions are recognised and amicably received, whereas strangers almost invariably are attacked and maltreated, even when introduced in the mixed company of old friends. There is a difference in this respect, however, among species; for while *Lasius flavus* behaves as above mentioned, *Formica fusca* shows a milder and much more courteous demeanour towards neighbours and strangers. In certain kinds of ants sight does not seem to be a very acute sense, inasmuch as the subjoined repeated experiments prove:—Food was placed a few inches from the nest on a glass slip, the straight road to and from which marked ants soon learned, but when the food had been shifted only a short distance from its first position, the same ants kept meandering in an extraordinary circuitous path from several minutes to half an hour before finding out the exact route from food to nest, and *vice versâ*. A diagrammatic chart of the path pursued appeared as one mass of confused and intricate cross lines. Slavery in certain genera is a positive institution, the Amazon ants (*Polyergus rufescens*) absolutely requiring a slave assistant to clean, dress and feed them. Repeated and varied experiments go to prove that they will rather die than help themselves. There are also parasite attendants on the ants, the curious blind wood-louse (*Platyarthrus Hoffmanseggii*) being common in nests; but the ants pay little attention to them, and when migrating leave these scavengers behind. Certain Diptera of the family *Thoridæ* are also parasitic on ants, Sir John having discovered some new species, the recently described *Thora formicarum* and *Platyphora Lubbocki* of Mr. G. H. Verrall.

A paper "On the Aspects of the Vegetation of Rodriguez" was read by Dr. I. Bailey Balfour, B.M., who, as Botanist, accompanied the Transit of Venus Expedition to that island in 1874. It seems that, like the Fauna, the Flora of Rodriguez has undergone very considerable changes, through human, subsidiary and local influences.

"The Fungi of the 'Challenger' Expedition" (third notice), by the Rev. M. J. Berkely, and "Tropical Ferns," by Prof. Harrington, U.S., were the titles of two other botanical communications which were taken as read.

Zoological Society of London.

February 6, 1877.—Osbert Salvin, Esq., F.R.S., in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of January.

Mr. Sclater exhibited and made remarks on some unnoticed characters in the original and unique specimen of Comrie's Manucode (*Manucodia Comrii*, Proc. Zool. Soc., 1876, p. 459).

Mr. Howard Saunders exhibited a specimen of the Panay Sooty Tern (*Sterna anæstheta*), which had been obtained on the English coast, and was the first recorded occurrence of this bird in the British Islands.

Dr. A. Günther read a memoir on the Tortoises collected by Commander Cookson, R.N., during the visit of H.M.S. 'Peterel' to the Galapagos Islands. The main results of Commander Cookson's visit consisted in giving us a knowledge of the Tortoise of Abingdon Island (*Testudo Abingdoni*) and of the Tortoise of the North of Albemarle Island (*T. microphyes*).

A communication was read from Mr. Robert Collett, containing an account of his observations on *Phylloscopus borealis*, as met with on the Varanger Fjord and adjacent parts of Finmark.

Mr. Sclater read a note on an apparently new species of Spur-winged Goose of the genus *Plectropterus*, proposed to be called *P. niger*, founded on two examples living in the Society's Gardens, which had been presented to the Society by Lieut.-General A. V. Cunningham.

Prof. A. H. Garrod read a paper on the mechanism of the invertebral substance and on some effects resulting from the erect position of man.

A communication was read from Sir Victor Brooke, containing notes on the small Rusine Deer of the Philippine Islands, and giving the description of a new species proposed to call *Cervus nigricans*, of which a female example was recently living in the Society's Gardens.

A paper by Mr. O. Salvin and Mr. Ducane Godman was read, giving the description of twelve new species and a new genus of butterflies from Central America.

Dr. Günther gave an account of the Zoological Collection made during the visit of H.M.S. 'Peterel' to the Galapagos Islands, which had been worked out by himself and his assistants in the Zoological Department of the British Museum.

Mr. R. B. Sharpe communicated the description of a new species of Pheasant of the genus *Lobiophasis* and of a new species of *Pitta* from the Lawas River, N.W. Borneo. Mr. Sharpe proposed to call the former *L. castaneicaudatus*, and the latter, *Pitta Ussheri*.—*P. L. Sclater*.

ENTOMOLOGICAL SOCIETY OF LONDON.

February 7, 1877.—Prof. WESTWOOD, M.A., President, in the chair.

The Secretary read a list of donations to the Library since the date of the last meeting, and thanks were voted to the donors.

Election of a Subscriber.

William Denison Roebuck, Esq., of Leeds, Hon. Sec. of the West Riding Consolidated Naturalists' Society and of the Leeds Natural History Society, was balloted for and elected a Subscriber.

The President nominated Messrs. J. W. Douglas, J. W. Dunning and Henry T. Stainton as Vice-Presidents for the ensuing year.

The President then delivered the Address, which he was prevented from delivering at the Annual Meeting, on the progress of Entomology during the past year, and which was ordered to be printed.

Exhibitions, &c.

Mr. F. Bond (on behalf of Mr. Cooke, of Brighton) exhibited another specimen of the North-American butterfly, *Danais Archippus*, taken during the second week of September last by Mr. Alford Wood, of New Close, Keymer, Sussex, flying over a field of clover near Hassock's Gate. This was the third specimen recorded as having been taken in this country; the first having been captured near Neath on the 6th September, and the second near Hayward's Heath on the 17th October, 1876, and recorded in the 'Entomologist's Monthly Magazine' for October, and in 'The Entomologist' for December, 1876.

The President brought for exhibition a specimen of the singular butterfly *Bhutanitis Lidderdalii*, Atkinson, from Bhotan. He also read a letter which he had received from Baron v. Osten-Sacken, referring to his paper on the genus *Systropus*, published in the last part of the 'Transactions' of this Society, in which he had stated that a species received from Natal (*S. crudelis*) had been bred from a cocoon resembling that of *Limacodes*, found on a tree of the genus *Mimosa*. The letter referred the President to a paper by Benj. D. Walsh in the 'Proceedings of the Boston Society of Natural History' (vol. ix., p. 300, 1864), in which he relates that he had bred a dipteron from a cocoon of *Limacodes hyalinus*. This dipteron, which he had communicated to Baron Osten-Sacken, proved to be the common North-American *Systropus* (*S. macer*, Loew), and was a remarkable instance of community of habit among insects of the same genus in far distant regions.

The President had also been informed by M. Ernest Olivier, of Moulin, who had recently visited Pompeii, that he had observed large numbers of *Bombylii* flying in company with a bee of which he had forwarded a specimen, but this proved to be an *Anthophora* (probably *A. nigrocincta*), and not an *Andrena*, like those described in his paper in the last part of the 'Transactions' ("Notæ Dipterologicæ," No. 1).

Mr. M'Lachlan exhibited a case of a Lepidopterous larva sent by Dr. Kirk from Zanzibar, who had found it on a species of *Mimosa*. He considered it to be allied, probably, to *Psyche* and *Oiketicus*, and was remarkable on account of its form, which bore a striking resemblance to that of a flattened *Helix*. It appeared to be constructed of a substance resembling *papier maché*, with a smooth whitish external coating.

Mr. C. O. Waterhouse exhibited varieties of British Lepidoptera, viz., *Chrysophanus phlœas*, *Polyommatus Adonis*, *P. Alexis* and *Agrotis exclamationis*.

Dr. F. Buchanan White forwarded to the Society the following account of a case of "Pruritus from an Unusual Cause," by Dr. Tilbury Fox, extracted from the 'Medical Examiner' of 21st December, 1876:—

"At the end of July, 1876, a gentleman resident in the Eastern Counties noticed on the eyelid of his infant a small red speck, which on examination with a hand-microscope proved to be a living parasite, partially imbedded in the skin. Several days subsequently his wife was greatly annoyed by pruritus, and her neck and chest were found studded here and there with these little red specks, which at first sight were thought to be "petechiæ," but turned out to be insects. They could be readily extracted with a pin. In the attempt to discover the source whence the parasites came, a pet pug dog was examined, and then collections of these parasites on the nose and between the eyes—where, in fact, the hair was least thick—were discovered. During August the little red visitors caused excessive annoyance to the servants and everyone in the house, defying all remedial measures, though some members of the household were very much less affected than others. Remove them as you would, the next day a fresh supply appeared, and the insects were found on the arms of the infant as well as the face, on the back, neck and chest, and even the nipples of the adults. A favourite long-haired French cat was examined, because one of the family after nursing it was greatly annoyed, and the ears were found infested. The hair fell off, leaving bald patches where the parasites were congregated on the dog and the cat. In the middle of August the animals were shut up, isolated, and regularly dressed with equal parts of sulphurous acid and glycerine, and the plague began to diminish at once. The members of the household had tried citrine ointment, compound sulphur ointment, detergent solution of tar, &c.; but still the nuisance continued in some degree, and a second cat was found affected. But when all the animals were shut out of the house the mischief did not cease. There was some doubt and difference of opinion with regard to the exact species of the parasite. A specimen was submitted to my friend Dr. Cobbold, and he pronounced it to be *Trombidium*, or garden mite, which lives on plants. It is closely related to the true mites, the itch insect, the little red "spider" of hot-houses, and the well-known *Leptus autumnalis*, or "harvest-bug." The annoying pruritus about the legs produced by the latter at the end of the summer, after a walk in the fields, &c., is well known to every one; and Dr. Heiberg has lately recorded that the nuisance assumed an epidemic form in a village in Denmark. In the present case the pruritus was chiefly around the neck and shoulders, and several parasites were removed from the eyelids. The plants in the garden were not examined to see if plant-mites were very abundant there, as this exact source was not suspected at the time. There can be little doubt, I think, that the original source must have been certain plants in the garden; that the house pets, who were undoubtedly first affected, were agents in the conveyance of the main portion of the parasites to the human members of the family, but not exclusively, the probability being that many of the people, especially after the pet cats and dog were excluded from the house, managed to be infected directly from the original source."

Papers read.

"Notes on the African *Saturnidæ* in the Collection of the Royal Dublin Society." By W. F. Kirby.

"Descriptions of new Genera and Species of Phytophagous Beetles belonging to the Family *Cryptocephalidæ*, together with Diagnoses and Remarks on previously described Genera." By Joseph S. Baly, F.L.S.

"Descriptions of new Species of Phytophagous Beetles belonging to the Family *Eumolpidæ*, and a Monograph of the Genus *Eumolpus*." By Joseph S. Baly, F.L.S., &c.—*F. G.*

NOTICES OF NEW BOOKS.

***Eastern Persia: An Account of the Journeys of the Persian Boundary Commission*, 1870—71—72.** Vol. I. The Geography and Narratives, by Majors St. John, Lovett, and Euan Smith, with an Introduction by Col. Sir F. Goldsmid, C.B. Vol. II. The Zoology and Geology, by W. T. Blanford, F.R.S. With numerous coloured plates. Published by the authority of the Government of India. London: Macmillan & Co. 1876.

The object of the mission of which these two handsome volumes detail the result was to settle the disputed boundaries on the eastern frontier of the Persian empire, the disputants being virtually the Shah of Persia on the one hand, and the Amir of Afghánistán (in right of certain acquired interest through rebel feudatories) on the other. By the settlement arrived at through this Commission, Persia got the position which is designated as Sistán Proper, while to Afghánistán was allotted the country on the right bank of the river Helmund, and, above a certain point on that stream, all the cultivated land on both banks.

Owing to numerous delays and difficulties which our diplomacy apparently created rather than averted, the labours of the Commissioners were tediously prolonged during several years, and the first volume of the work before us is occupied with narratives of the various journeys necessitated or undertaken, and an account of the observations and researches made *en route* by the different members of the Staff. It is in fact a kind of Blue Book of the Persian Boundary Commission, and undoubtedly embodies a large amount of valuable information, although of a nature somewhat foreign to the scope of this journal.

The second volume demands a more lengthy notice at our hands. Fortunately for all who are interested in Natural History, there was one amongst the above-named officers, Major O. B. St. John, who was actuated by far higher views than those of an ordinary traveller and sportsman, and, with the aid of a native collector sent from the Indian Museum at Calcutta, he amassed during the years 1869—70—71 no less than 500 specimens of mammals and birds from such hitherto little-known districts as the forests south and west of Shiráz and its vicinity, and also from the hill ranges between Shiráz and Isfahán, from Tehrán and the Elburz mountains, and from the neighbourhood of Resht, near the Caspian. The consequence of this able pioneering was that when a highly trained scientific observer like Mr. Blanford arrived in the country, in 1872, he found the road considerably smoothed for him, from a naturalist's point of view, and indeed the valuable co-operation of Major St. John is most fully acknowledged by him in these pages. These two naturalists then made a journey in company from Gwádor, in Balúchistán, to Shiráz, Isfahán, and Tehrán, and the result of their joint observations and collections, the latter carefully worked out in Europe with the aid of the best public and private museums for comparison and identification, appear in the present volume.

The author's systematic catalogue principally relates to mammals, birds, reptiles, and amphibia, 347 species and 2051 specimens of which were obtained, exclusive of collections of individuals of the two latter groups previously examined and described by Dr. Anderson, of the Indian Museum, Calcutta. Mr. Blanford's scientific descriptions are supplemented by many valuable and interesting remarks by Major St. John, relative to the habits of the various species he observed during his prolonged residence in Persia, an advantage from which Mr. Blanford was necessarily debarred. He modestly states that even the present cannot pretend to be other than a very imperfect list of the fauna of this vast—and to a great extent, unexplored—country, the north-eastern portion of which is still almost a *terra incognita*, whilst there is much to he learned respecting the animals inhabiting the plains extending from the Tigris to the Zagros mountains, the western slopes of which are covered with forest, as are also the southern shores of the Caspian. Prior to the present expedition our knowledge of the Zoology of Persia proper was extremely limited, the explorations of Pallas and Eichwald having been restricted to the shores of the Caspian, whilst those of Gildenstadt were principally confined to the Caucasus, and by far the most important, although still meagre, information was to be derived from the "Noté di un viaggio in Persia" (Milan, 1865), by Professor De Filippi, of Turin, who accompanied an Italian embassy in 1862. In this work a list is given of 30 species of mammals, 167 birds, 39 reptiles, 3 amphibia, and 22 fishes; but the investigations of Major St. John and Mr. Blanford have increased this catalogue to no less than 89 mammals, 384 birds, 92 reptiles, and 9 amphibia! The number of species is not surprising when we consider the great variation in soil, climate, and temperature to be found in a country like Persia, which consists to a great extent of desert plateaux of varying and often considerable elevation, for the most part destitute of vegetation, whilst on the shores of the Caspian is a moist forest region, and a thick belt of woodland also extends from the Zagros mountains to Shiráz; and again towards the Persian Gulf and Indian Ocean the vegetation becomes more tropical, though rarely luxuriant. Mr. Blanford analyses the character of the distinctive fauna of each of the various regions, and sums up that of the Persian highlands as being Palæarctic, with a great prevalence of desert forms, remarking upon the great difficulty of establishing a desert province, although there can be little doubt as to the existence of a true desert fauna.

Many of the forms of animal life are characteristic of Central Asia, especially the Ounce (*F. uncia*), *Alactaga indica*, a Jerboa hitherto only known from Afghanistan, and *Spermophilus concolor*, amongst mammals; whilst such more widely distributed forms as *Felis pardus*, *F. chaus*, *Ovis cycloceros*, *Capra ægagrus*, &c., are also to be found, along with species restricted to Persia, representative forms of well-known families. Such are the new species of Hedgehog, *Erinaceus macracanthus*, *Vulpes persicus*, *Meles canescens*, *Gerbillus persicus*, and *Gazella subgutturosa*, whilst under still closer restrictions as regards range we find three species of Bats, a Jerboa, and *Lagomys rufescens*, a Nuthatch (*Sitta rupicola*), and ten species of reptiles. The fauna of the forest district along the south-east coast of the Caspian is extremely interesting, for, although on the whole Palæarctic, there are several species apparently peculiar to the locality, and also several Eastern forms unknown in other parts of Persia, such as the Tiger, *Cervus Caspius* (a Deer allied to *C. axis*, belonging to the Indo-Malayan group), and a Viper (*Halys Pallasii*). The existence of the Tiger in the Caspian provinces north of the Elburz range, corresponding in part to the ancient Hyrcania, was well known to ancient writers, and allusion to Hyrcanian and Caucasian Tigers must be familiar to all readers of Virgil; but the fact of a Deer of Indo-Malayan affinities being found in the same district as *Cervus morral*, the only true Elaphine Deer which is found in Persia, is very remarkable, and an important addition to our knowledge of geographical distribution. The birds of this district call for little remark, as the author's new species, *Erythacus hyrcanus*, is confessedly only a local and brilliant form of the common Robin, and *Garrulus hyrcanus* is one of those local forms of the Jay which drive the systematist to despair, with the alternative of "lumping" nearly all the races together, or of making as many species as there are varieties. With regard to the wooded slopes of the Zagros, and the oak forest as far as Shiráz, the fauna, so far as known from Major St. John's collections, appears to be mainly Palæarctic, although one of the characteristic mammals is the Lion, which is found in Mesopotamia. It does not appear to exist on the table-land of Persia, nor in Balúchistán, and, so far as can be judged from the limited knowledge we possess, it rather resembles the form inhabiting North-East Africa than the Guzerat animal. Major St. John's notes upon this species are extremely interesting, and the narrative of his adventure with a lioness is of far more thrilling interest than half the stories put together with which we are familiar. Indeed of late nothing less than four or five lions bolting from cover altogether at a "hot corner," and being rolled over (on paper) like rabbits, will suit the modern appetites for large bags, and it is refreshing to meet with a lioness that could look an Englishman in the face without dying on the spot.

This district produced a new species of Woodpecker (*Picus Sancti-Johannis*), closely allied to the European *P. medius*, and two new Titmice—one *Parus phæonotus*, allied to *P. ater*, but distinguishable by its olive-brown back; the other *P. persicus*, a pale-coloured form of *P. cæruleus*.

Of the fauna of Mesopotamia Mr. Blanford's regard for accuracy precludes him from saying much, as available information on the subject proved very scanty, but his remarks on the Zoology of the shores of the Persian Gulf and Balúchistán are of great interest, as he has personally explored this region, the fauna of which differs widely from that of the rest of Persia. The Palæarctic forms are now almost entirely replaced on the highlands by desert species of the Indian fauna, and in a few cases by Malayan types, whilst several others are African, and are either unknown in India or at most do not extend beyond Sind and the neighbouring districts east of the Indus, all of these last being desert types.

Space will not permit us to pick out the new and interesting species which he has described, nor would it be fair to the author to do so. Many of the mammals and birds are illustrated by beautiful coloured plates by Keulemans, as well as by woodcuts and by lithographic engravings of the reptiles by Ford, and an excellent coloured map is given of the geographical provinces. On the whole the volume is an indispensable one to naturalists, and is in every way worthy of Mr. Blanford's high reputation.